DOCUMENT RESUME

ED 285 732 SE 048 320

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TITLE The Effects of the School for Science and Technology on Other High School Programs: Baseline Data and Initial Observations. The Thomas Jefferson High School for Science and Technology Report No. 1.
INSTITUTION Fairfax County Schools, Va.
PUB DATE Oct 86
NOTE 28p.; For the other reports in this series, see SE 048 321-322.
AVAILABLE FROM Fairfax County Public Schools, 10700 Page Ave., Fairfax, VA 22030.
PUB TYPE Reports - Descriptive (141) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academically Gifted; *Enrollment; High Schools; *Magnet Schools; Mathematics Curriculum; Mathematics Education; Mathematics Instruction; Nontraditional Education; Science and Society; Science Curriculum; Science Education; Science Instruction; *Secondary School Mathematics; *Secondary School Science; *Teacher Effectiveness
IDENTIFIERS *Fairfax County Schools VA

ABSTRACT

The Thomas Jefferson High School for Science and Technology (Fairfax County, Virginia) offers a comprehensive college preparatory program emphasizing the sciences, mathematics, and technology. The school serves students selected on the basis of aptitude and interest in the biological, physical, mathematical, and computer sciences, and who intend to persue college preparation in the sciences, engineering, or related fields. This document is concerned with the effects of this program on the enrollment at other schools in the district in special courses for the gifted and talented (GT) along with the possible effects on the quality of the faculty in those programs. The data described in this report indicate that the new program had no negative impact on the ability of the other high schools to sustain ninth grade GT programs in English, mathematics, and social studies, although in science the issue remains unclear for several reasons. The reductions in faculty in other high schools due to transfers to the new school likewise were determined to have no negative impact on GT offerings at any grade level. (TW)

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ED285732

THE THOMAS JEFFERSON HIGH SCHOOL FOR SCIENCE AND TECHNOLOGY

Report #1
The Effects of the School for Science and Technology on Other High School Programs

Baseline Data and Initial Observations

U.S. DEPARTMENT OF EDUCATION
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Fairfax County Public Schools
Fairfax, Virginia

October 1986

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EXECUTIVE SUMMARY

The opening of the Thomas Jefferson High School for Science and Technology created concern in two specific areas relative to course offerings and enrollment opportunities for students at other high schools within Fairfax County. These two areas of concern were:

1) The absence of science and technology students would cause other schools to have insufficient enrollment to support certain advanced or accelerated course offerings; and

2) The relocation of certain faculty to science and technology would reduce the availability and/or the quality of coursework, particularly in science and mathematics areas.

Detailed and careful analyses of enrollments in appropriate courses/programs were conducted on a school-by-school basis. The analyses were controlled by a set of distinct assumptions made to focus on every possible negative effect of science and technology enrollments on 9th grade GT course offerings. In other words, the assumptions in no way diminished the impact of science and technology enrollments.

Data collected specifically compared enrollments the year prior to the opening of the School for Science and Technology with its first year of operation and considered ninth grade impact only. Courses and programs examined were restricted to those considered normal and appropriate for students exhibiting the characteristics of science and technology students.

The 21 high schools in Fairfax County experienced a decrease of 821 students in ninth grade enrollment from 1984-85, the year before the School for Science and Technology opened, to 1985-86, the year the School for Science and Technology opened. Three hundred nineteen (319) of the 1985-86 freshman class at the Thomas Jefferson High School for Science and Technology lived within the 21 high school boundaries. Five percent (5%) of these students came from private schools; assuming these students would have attended FCPS high schools, the freshman at the School for Science and Technology represented 39% of the overall decrease in ninth grade enrollments in 1985-86.

Enrollments in ninth grade gifted and talented courses in English, mathematics, science, and social studies and the number of sections of each of these courses offered in 1984-85 and in 1985-86 (the year the School for Science and Technology opened) were analyzed for programmatic impact. In English, countywide, there was a decrease from 62 to 60 sections of GT English with a decrease of 283 students. No Fairfax County high school failed to have a ninth grade GT English program in 1985-86. In social studies, there was an increase countywide in the number of sections of GT social studies from 54 to 59, even though enrollment in these courses had decreased by 39 students. No Fairfax County high school failed to have a ninth grade GT social studies program in 1985-86.

In mathematics, there was a decrease in the number of sections of Algebra I GT and Geometry GT from 49 in 1984-85 to 42 in 1985-86, with 197 fewer students in 1985-86. All high schools had a ninth grade GT program in mathematics in 1985-86.

The ninth grade Earth Science GT course enrolled, countywide, considerably fewer students than ninth grade GT courses in English, mathematics, and social studies. This may be due to ninth grade students choosing to enroll in biology courses with sophomores. The number of sections of Earth Science GT decreased from 28 to 21 from 1984-85 to 1985-86, with a decrease of 165 students. Two high schools did not offer the course in 1984-85 or in 1985-86; four high schools offered the course in 1984-85 but did not in 1985-86.

Based on these data, the School for Science and Technology had no negative impact on the ability of the other high schools to sustain ninth grade GT programs in English, mathematics, and social studies. In science the issue is unclear. Although six of 21 schools did not offer Earth Science GT the year the School for Science and Technology opened (two of these did not offer Earth Science GT the preceding year as well), the reasons may include a combination of the following factors: preference of ninth graders not to take science in the ninth grade, preference of ninth graders for biology rather than earth science, declining enrollments, and loss of potential students to the School for Science and Technology.

Students enrolled at science and technology represented 10% of all center-based gifted and talented enrollment at their grade level, which means that 90% of center-based gifted and talented students are not attending Jefferson.

Reductions in faculty at other high schools due to transfers to the School for Science and Technology likewise was determined to have had no negative impact on advanced/accelerated course offerings at any grade level.

INTRODUCTION

The Thomas Jefferson High School for Science and Technology is a unique Fairfax County public school offering a comprehensive college preparatory program emphasizing the sciences, mathematics, and technology. The school serves students selected on the basis of aptitude and interest in the biological, physical, mathematical, and computer sciences and who intend to pursue college preparation in the sciences, engineering, or related fields. The school opened with a freshman class of 400 in 1985. There are approximately 800 freshmen and sophomores at the school for the 1986-87 session. By 1988 there will be 1,600 students in grades 9-12.

The school is the result of a partnership of the private and public sectors created to improve and strengthen education in mathematics, science, and technology. Representatives from business and industry and staff of the Fairfax County Public Schools worked together in curriculum and facilities development for the school. The Fairfax County Public Schools Education Foundation, Inc., governed by chief executive officers of the local business community, has successfully raised business and industry support for the school including cash, equipment, training, and technical assistance for the school and its staff. To date, this contribution exceeds two million dollars.

As the Governor's School for Science and Technology in northern Virginia, the Thomas Jefferson High School for Science and Technology receives some funding from the Virginia Department of Education. The regional status of the school means that students residing in the participating northern Virginia school districts are eligible to apply for admission. School districts eligible to participate include the counties of Arlington, Fairfax, Loudoun, and Prince William; and the cities of Alexandria, Falls Church, Manassas, and Manassas Park. Prior to application deadlines each year, the specified school districts announce their intention to participate or not to participate in the regional school.

Because the Thomas Jefferson High School for Science and Technology is a public school, no payment for tuition or transportation is made by students. Each school division participating in the regional school funds costs associated with attending the school, including bus transportation. An extensive network of bus routes services the 900 square mile school boundary area. Each participating school division provides transportation for its students. The tuition charge for 1985-86 was $4,985 per student; for the 1986-87 session the charge is $5,460.

PROBLEM STATEMENT

The knowledge that the Thomas Jefferson High School for Science and Technology would reduce high school enrollments at the other 21 high schools at each grade level (9-12) led to concern that these schools may not be able to support certain advanced or accelerated course offerings. Others expressed concern that the faculty selected for the school would also reduce the availability of coursework, or perhaps the quality of coursework, at the other schools because of the relocation of certain faculty recruited for the science and technology program.

The purposes of this report are to establish the baseline data against which impact analyses and comparisons can be made (much of the potential impact will not be discernable until current freshmen reach later grades), to state initial observations made concerning the impact of the school, and to report comparative data available after one year of operation.

BASELINE DATA

Enrollments

Because the School for Science and Technology began operation for school year 1985-86 it was necessary to identify, extract, and retain data concerning the prior year's enrollments; i.e., school year 1984-85 for comparative purposes. A basic assumption was made concerning this data collection. These students (those selected for science and technology) would, based on the qualifications required for admission, be enrolled in a college-bound sequence of courses had they remained at their neighborhood school. Hence, only courses appropriate to this population of students were selected for inclusion in the data collection. No effort was made to include all course offerings.

Statistics were drawn from the following sources:

- Virginia Department of Education
- Teacher's Daily Assignment Reports
- Advanced Placement Report, FCPS
- Gifted and Talented Report, FCPS
- Master Schedules, FCPS

Faculty

Data were collected and maintained concerning the prior teaching assignment and location for each science and technology faculty member.

ANALYSIS OF ENROLLMENTS - GRADE 9

In order to draw meaningful conclusions from these data, it was necessary to present the results based upon a series of assumptions. The following list presents the assumptions adopted that produced the results reported and, therefore, are the bases for conclusions formulated.

1. Students would have attended the high school in whose attendance boundaries they reside if they had not attended the School for Science and Technology.

2. Reductions in ninth grade enrollments at any given school (other than science and technology enrollments) had no impact on course offerings at the school.

3. Enrollment procedures for any given course at any school did not change between school year 1984-85 and 1985-86; e.g., student/teacher ratios, average class sizes, enrollments needed to create new sections.

4. All science and technology students would have enrolled in all courses examined by this analysis had they remained at their home school; and, conversely, any reductions in enrollments from one year to the next in any course considered by this analysis are attributable to science and technology students up to the number residing in the respective attendance area.

5. The number of students desiring to enroll in courses studied remained as high in school year 1985-86 as in 1984-85.

The School for Science and Technology enrolled a total of 319 freshmen for school year 1985-86 from Fairfax County high school attendance areas. These data show a range from four in the Mount Vernon attendance area to 37 within Annandale's boundaries. It should be noted that the Annandale statistic includes those students from both the Annandale and Jefferson attendance areas brought on by the consolidation of the ninth grade from these two schools. The assumption that all 319 students would have attended the school in whose boundary they resided is tempered by the fact that 5% of the first class at the School for Science and Technology came from private/parochial schools.

In addition to these 319 students there was a decrease of 502 others reflecting an overall systemwide decline of ninth grade students from school year 1984-85 to 1985-86 of 821 students in Fairfax County Public Schools. Raw data on science and technology enrollments by attendance area and the balance of the ninth grade enrollment changes are presented by area and by school in Table I. Table I demonstrates that 39% of the ninth grade enrollment reduction could be attributed to the School for Science and Technology's freshman class. The analyses which follow assume that the additional reduction of 502 students did not impact upon course offerings examined.

The analyses of enrollments by courses offered were restricted to those courses labeled as GT or those courses that would otherwise be considered a normal choice for students typical to science and technology enrollees. For English, four courses were examined; specifically, English 9 (GT), English/World Civilization 9 (GT), English/World Geography 9 (GT), and English/World History 9 (GT). For social studies, World Geography (GT), World History (GT), and World Civilization (GT) were considered in addition to the combination courses with English. For mathematics, Algebra I (GT), Geometry, and Geometry (GT) were included. For science, Earth Science (GT) was the only relevant offering. (Science and technology freshmen enroll for Biology; therefore, any potential impact will be reflected in school year 1986-87 analyses against 10th grade Biology offerings in base schools.)

TABLE I
NINTH GRADE ENROLLMENTS

Area I	84/85	85/86	Diff.	S&T Students
Edison	381	305	-76	7
Hayfield	557	564	+7	13
Lee	502	444	-58	8
Mount Vernon	442	420	-22	4
West Potomac	662*	553	-109*	18
TOTAL AREA I	2544	2286	-258	50

Area II	84/85	85/86	Diff.	S&T Students
Annandale	706	613	-93**	37
Falls Church	415	355	-60	14
Oakton	552	505	-47	32
Stuart	392	384	-8	16
Woodson	545	510	-35	22
TOTAL AREA II	2610	2367	-243	121

Area III	84/85	85/86	Diff.	S&T Students
Herndon	654	570	-84	10
Langley	465	445	-20	10
Madison	613	573	-40	13
Marshall	378	378	0	9
McLean	466	426	-40	12
S. Lakes	568	574	6	12
TOTAL AREA III	3144	2966	-178	66

Area IV	84/85	85/86	Diff.	S&T Students
Chantilly	645	611	-34	18
Fairfax	389	501	112	7
Lake Braddock	869	870	1	18
Robinson	974	800	-174	25
W. Springfield	538	491	-47	14
TOTAL AREA IV	3415	3273	-142	82
GRAND TOTAL	11713	10892	-821	319[1]

[1] These statistics reflect that the ninth grade in the 21 high schools declined by 821 students between school year 1984-85 and 1985-86 of which 319 or 39% could be attributed to science and technology enrollments.

* Difference in enrollment from the 9th grades at Fort Hunt and Groveton in 1984-85 and West Potomac in 1985-86.

** Difference in enrollment from the 9th grades at Annandale and Jefferson in 1984-85 and Annandale in 1985-86.

English

Four courses were included for this analysis; specifically English 9 (GT), English/World Civilization 9 (GT), English/World Geography 9 (GT), and English/World History 9 (GT). Table II reflects the data demonstrating the changes evidenced over the two academic years.

Although demonstrating a net decrease of only two sections in total, six of the 22 schools reported fewer sections of GT English during school year 1985-86 when compared to 1984-85. Only one school, Robinson, reported a loss of two (2) sections with the balance reporting a loss of one. It is important to note that Robinson's total ninth grade enrollment was down 174 students during this period of which only 25 were science and technology students. Twenty-four fewer students enrolled in GT English at Robinson.

Mount Vernon reported the loss of one GT English section with an enrollment of 19 fewer students. Twenty-two fewer ninth graders in total were enrolled at Mount Vernon. Only four (4) science and technology students were from the Mount Vernon attendance area. Likewise, West Springfield reported a loss of one GT English section with an enrollment of 28 fewer students. Forty-seven fewer ninth graders in total were enrolled at West Springfield of which only 14 were science and technology students. Annandale (combined with Jefferson) reported one fewer section of GT English and 63 fewer students enrolled. Ninety-three (93) fewer ninth graders in total were enrolled at Annandale of which only 37 were science and technology students.

The sixth school reporting a reduction in GT English enrollments was Stuart reporting the loss of one section and seven (7) students. The prior year Stuart had provided two sections with 33 enrolled compared to one section with 26 enrolled in 1985-86. Stuart's overall enrollment in total for grade nine was down only eight students although 16 were sent to science and technology.

Social Studies

Eight courses were included for this analysis; specifically English/World Civilization 9 (GT), English/World Geography 9 (GT), English/World History 9 (GT), World History (GT), World Cultures (GT), World Civilization (GT), World Geography (GT), and Humanities (GT). Table III (page 7) reflects the data demonstrating the changes evidenced over the two (2) academic years producing a net difference of five (5) additional sections and 39 fewer students.

Eight (8) schools reported fewer sections of GT Social Studies courses although the net difference was an increase of five (5) sections. Six (6) schools reported one (1) fewer section and two (2) schools (Lake Braddock and Annandale) two (2) fewer sections.

Lee reported one (1) less section and 33 fewer students enrolled in GT Social Studies. Only eight (8) science and technology students were included in the 58 fewer freshmen at Lee.

Stuart reported the loss of one (1) section and 15 students, Madison one (1) section and 17 students, Fairfax one (1) section and 17 students, Robinson one (1) section and 41 students, and West Springfield one (1) section and 14 students. Lake Braddock reported two (2) fewer sections and 44 fewer students with 18 science and technology students. Annandale reported two (2) fewer sections and 65 fewer students with 37 science and technology students.

TABLE II
ANALYSIS OF ENGLISH ENROLLMENTS
(GT COURSES)

	84-85		85-86		Diff.			
	# Sec.	# Enr.	# Sec.	# Enr.	# Sec.	# Enr.	TJHSST Enroll.	Total 9th Gr. Enrollment Change
AREA I								
Edison	2	50	2	45	0	-5	7	-76
Hayfield	2	45	2	52	0	7	13	+7
Lee	2	53	2	39	0	-14	8	-58
Mt. Vernon	3	67	2	48	-1	-19	4	-22
W. Potomac	3	113	4	99	1	-14	18	-109*
AREA I TOTALS					0	-45	50	-258
AREA II								
Annandale	3	93	2	30	-1	-63	37	-93**
F. Church	2	57	2	32	0	-25	14	-60
Oakton	4	95	3	62	-1	-33	32	-47
Stuart	2	33	1	26	-1	-7	16	-8
Woodson	2	73	2	97	0	24	22	-35
AREA II TOTALS					-3	-104	121	-243
AREA III								
Herndon	2	119	4	93	2	-26	10	-84
Langley	4	131	4	119	0	-12	10	-20
Madison	3	79	3	80	0	1	13	-40
Marshall	2	52	3	84	1	32	9	0
McLean	6	171	6	136	0	-35	12	-40
S. Lakes	2	113	2	109	0	-4	12	6
AREA III TOTALS					3	-44	66	-178
AREA IV								
Chantilly	2	54	2	40	0	-14	18	-34
Fairfax	2	39	2	42	0	3	7	112
Lk. Brad.	4	121	5	94	1	-27	18	1
Robinson	6	119	4	95	-2	-24	25	-174
W. Spfld.	4	97	3	69	-1	-28	14	-47
AREA IV TOTALS					-2	-90	82	-142
TOTALS	62	1774	60	1491	-2	-283	319	-821

* Difference in enrollment from the 9th grades at Fort Hunt and Groveton in 1984-85 and West Potomac in 1985-86.

** Difference in enrollment from the 9th grades at Annandale and Jefferson in 1984-85 and Annandale in 1985-86.

TABLE III
ANALYSIS OF SOCIAL STUDIES ENROLLMENTS
(GT COURSES)

	84-85		85-86		Diff.			
	# Sec.	# Enr.	# Sec.	# Enr.	# Sec.	# Enr.	TJHSST Enroll.	Total 9th Gr. Enrollment Change
AREA I								
Edison	1	16	1	11	0	-5	7	-76
Hayfield	1	24	1	28	0	4	13	+7
Lee	2	53	1	20	-1	-33	8	-58
Mt. Vernon	1	24	1	18	0	-6	4	-22
W. Potomac	3	99	5	124	2	25	18	-109*
AREA I TOTALS					1	-15	50	-258
AREA II								
Annandale	3	93	1	28	-2	-65	37	-93**
F. Church	2	57	2	32	0	-25	14	-60
Oakton	2	59	2	37	0	-22	32	-47
Stuart	3	52	2	37	-1	-15	16	-8
Woodson	2	73	2	97	0	24	22	-35
AREA II TOTALS					-3	-103	121	-243
AREA III								
Herndon	2	119	4	93	2	-26	10	-84
Langley	4	131	8	245	4	114	10	-20
Madison	2	44	1	27	-1	-17	13	-40
Marshall	2	43	5	117	3	74	9	0
McLean	5	136	8	167	3	31	12	-40
S. Lakes	2	113	3	146	1	33	12	6
AREA III TOTALS					12	209	66	-178
AREA IV								
Chantilly	2	54	2	40	0	-14	18	-34
Fairfax	2	38	1	21	-1	-17	7	112
Lk. Brad.	4	104	2	60	-2	-44	18	1
Robinson	5	102	4	61	-1	-41	25	-174
W. Spfld.	4	83	3	69	-1	-14	14	-47
AREA IV TOTALS					-5	-130	82	-142
TOTALS	54	1517	59	1478	5	-39	319	-821

* Difference in enrollment from the 9th grades at Fort Hunt and Groveton in 1984-85 and West Potomac in 1985-86.

** Difference in enrollment from the 9th grades at Annandale and Jefferson in 1984-85 and Annandale in 1985-86.

Mathematics

The mathematics analyses were made by course instead of by total. This decision was made because of the intense interest in these offerings and because combining statistics for algebra and geometry may have led to false conclusions. Courses included were Algebra I (GT), Geometry and Geometry (GT).

There was an increase of one (1) section of Algebra I (GT) and a net enrollment decrease of six (6) students during the period. Table IV displays these data by school. No school demonstrated a decrease in sections and only two (2), Lee (-2) and Edison (-11), a decrease in enrollment. These two (2) schools had freshman class reductions of 58 and 76 respectively of which 15 were science and technology students.

The Geometry analysis appears in Table V (page 10). There were 22 additional sections taught over the period with an enrollment increase of 418 students. Two (2) schools (West Potomac and Falls Church) reported the loss of one (1) section (although West Potomac's Geometry enrollment increased), Lake Braddock and Oakton reported a loss of three (3) sections and 53 and 36 students respectively. West Springfield reported a loss of two (2) sections and 72 students. Lake Braddock had 18 science and technology students, West Springfield 14, and Oakton 32, with freshman class enrollment changes of +1, -47, and -47 respectively.

The Geometry (GT) data, Table VI (page 11), reports a reduction of eight (8) sections and 191 students. Six schools reported fewer sections. West Potomac, Langley, and Madison reported one (1) less section with 5, 9, and 29 fewer students respectively. Annandale, McLean, and Robinson reported two (2) fewer sections with 45, 14, and 29 fewer students respectively.

Science

Earth Science (GT) was the only course examined for this analysis. Since 9th grade science and technology students enroll in biology compared to 10th grade non-science and technology students (in general), the analysis of impact on biology enrollments will not be meaningful until school year 1986-87 statistics are known.

The earth science analysis (Table VII, page 12) reflects a reduction of seven (7) sections and 165 students. Eight (8) schools reported fewer sections (six reported one fewer and two reported two fewer). Four (4) schools (Hayfield, Mount Vernon, Annandale, and Chantilly) reported complete removal of the Earth Science (GT) offering.

TABLE IV
ANALYSIS OF ALGEBRA I ENROLLMENTS
(GT COURSES)

	84-85		85-86		Diff.			
	# Sec.	# Enr.	# Sec.	# Enr.	# Sec.	# Enr.	TJHSST Enroll.	Total 9th Gr. Enrollment Change
AREA I								
Edison	1	24	1	22	0	-2	7	-76
Hayfield	0	0	1	3	1	3	13	+7
Lee	1	24	1	13	0	-11	8	-58
Mt. Vernon	0	0	0	0	0	0	4	-22
W. Potomac	0	0	0	0	0	0	18	-109*
AREA I TOTALS					1	-10	50	-258
AREA II								
Annandale	0	0	0	0	0	0	37	-93**
F. Church	0	0	0	0	0	0	14	-60
Oakton	0	0	0	0	0	0	32	-47
Stuart	0	0	0	0	0	0	16	-8
Woodson	0	0	0	0	0	0	22	-35
AREA II TOTALS					0	0	121	-243
AREA III								
Herndon	0	0	0	0	0	0	10	-84
Langley	0	0	0	0	0	0	10	-20
Madison	0	0	0	0	0	0	13	-40
Marshall	0	0	0	0	0	0	9	0
McLean	1	22	1	26	0	4	12	-40
S. Lakes	0	0	0	0	0	0	12	6
AREA III TOTALS					0	4	66	-178
AREA IV								
Chantilly	0	0	0	0	0	0	18	-34
Fairfax	0	0	0	0	0	0	7	112
Lk. Brad.	0	0	0	0	0	0	18	1
Robinson	0	0	0	0	0	0	25	-174
W. Spfld.	0	0	0	0	0	0	14	-47
AREA IV TOTALS					0	0	82	-142
TOTALS	3	70	4	64	1	-6	319	-821

* Difference in enrollment from the 9th grades at Fort Hunt and Groveton in 1984-85 and West Potomac in 1985-86.

** Difference in enrollment from the 9th grades at Annandale and Jefferson in 1984-85 and Annandale in 1985-86.

TABLE V
ANALYSIS OF GEOMETRY ENROLLMENTS

	84-85		85-86		Diff.			
	# Sec.	# Enr.	# Sec.	# Enr.	# Sec.	# Enr.	TJHSST Enroll.	Total 9th Gr. Enrollment Change
AREA I								
Edison	8	193	10	232	2	39	7	-76
Hayfield	10	293	12	350	2	57	13	+7
Lee	8	238	15	376	7	138	8	-58
Mt. Vernon	10	294	11	330	1	36	4	-22
W. Potomac	15	295	14	366	-1	71	18	-109*
AREA I TOTALS					11	341	50	-258
AREA II								
Annandale	21	542	23	560	2	18	37	-93**
F. Church	11	289	10	275	-1	-14	14	-60
Oakton	20	517	17	481	-3	-36	32	-47
Stuart	8	217	10	242	2	25	16	-8
Woodson	16	458	17	493	1	35	22	-35
AREA II TOTALS					1	28	121	-243
AREA III								
Herndon	15	409	18	454	3	45	10	-84
Langley	14	397	14	367	0	-30	10	-20
Madison	15	487	19	467	4	-20	13	-40
Marshall	9	217	9	239	0	22	9	0
McLean	11	300	13	315	2	15	12	-40
S. Lakes	15	402	15	425	0	23	12	6
AREA III TOTALS					9	55	66	-178
AREA IV								
Chantilly	14	411	17	456	3	45	18	-34
Fairfax	9	243	10	275	1	32	7	112
Lk. Brad.	30	826	27	773	-3	-53	18	1
Robinson	25	703	27	745	2	42	25	-174
W. Spfld.	19	512	17	440	-2	-72	14	-47
AREA IV TOTALS					1	-6	82	-142
TOTALS	303	8243	325	8661	22	418	319	-821

* Difference in enrollment from the 9th grades at Fort Hunt and Groveton in 1984-85 and West Potomac in 1985-86.

** Difference in enrollment from the 9th grades at Annandale and Jefferson in 1984-85 and Annandale in 1985-86.

TABLE VI
ANALYSIS OF GEOMETRY ENROLLMENTS
(GT COURSES)

	84-85		85-86		Diff.			
	# Sec.	# Enr.	# Sec.	# Enr.	# Sec.	# Enr.	TJHSST Enroll.	Total 9th Gr. Enrollment Change
AREA I								
Edison	1	33	1	24	0	-9	7	-76
Hayfield	1	28	1	13	0	-15	13	+7
Lee	2	53	2	34	0	-19	8	-58
Mt. Vernon	1	21	1	17	0	-4	4	-22
W. Potomac	4	74	3	69	-1	-5	18	-109*
AREA I TOTALS					-1	-52	50	-258
AREA II								
Annandale	3	67	1	22	-2	-45	37	-93**
F. Church	1	22	1	23	0	1	14	-60
Oakton	2	47	2	24	0	-23	32	-47
Stuart	1	16	1	14	0	-2	16	-8
Woodson	1	27	2	38	1	11	22	-35
AREA II TOTALS					-1	-58	121	-243
AREA III								
Herndon	2	58	2	59	0	1	10	-84
Langley	5	119	4	110	-1	-9	10	-20
Madison	3	68	2	39	-1	-29	13	-40
Marshall	2	29	2	40	0	11	9	0
McLean	3	55	1	41	-2	-14	12	-40
S. Lakes	3	63	3	78	0	15	12	6
AREA III TOTALS					-4	-25	66	-178
AREA IV								
Chantilly	1	36	1	27	0	-9	18	-34
Fairfax	2	45	2	35	0	-10	7	112
Lk. Brad.	2	38	2	38	0	0	18	1
Robinson	4	79	2	50	-2	-29	25	-174
W. Spfld.	2	40	2	32	0	-8	14	-47
AREA IV TOTALS					-2	-56	82	-142
TOTALS	46	1018	38	827	-8	-191	319	-821

* Difference in enrollment from the 9th grades at Fort Hunt and Groveton in 1984-85 and West Potomac in 1985-86.

** Difference in enrollment from the 9th grades at Annandale and Jefferson in 1984-85 and Annandale in 1985-86.

TABLE VII
ANALYSIS OF EARTH SCIENCE ENROLLMENTS
(GT COURSES)

	84-85		85-86		Diff.			
	# Sec.	# Enr.	# Sec.	# Enr.	# Sec.	# Enr.	TJHSST Enroll.	Total 9th Gr. Enrollment Change
AREA I								
Edison	1	28	2	23	1	-5	7	-76
Hayfield	1	27	0	0	-1	-27	13	+7
Lee	1	7	1	8	0	1	8	-58
Mt. Vernon	1	4	0	0	-1	-4	4	-22
W. Potomac	2	18	1	12	-1	-6	18	-109*
AREA I TOTALS					-2	-41	50	-258
AREA II								
Annandale	1	26	0	0	-1	-26	37	-93**
F. Church	1	12	1	15	0	3	14	-60
Oakton	0	0	0	0	0	0	32	-47
Stuart	1	14	1	11	0	-3	16	-8
Woodson	0	0	0	0	0	0	22	-35
AREA II TOTALS					-1	-26	121	-243
AREA III								
Herndon	2	52	2	46	0	-6	10	-84
Langley	3	71	3	84	0	13	10	-20
Madison	1	24	2	35	1	11	13	-40
Marshall	1	17	1	15	0	-2	9	0
McLean	2	38	1	20	-1	-18	12	-40
S. Lakes	1	23	2	38	1	15	12	6
AREA III TOTALS					1	13	66	-178
AREA IV								
Chantilly	2	40	0	0	-2	-40	18	-34
Fairfax	1	15	1	20	0	5	7	112
Lk. Brad.	3	76	1	25	-2	-51	18	1
Robinson	2	35	1	24	-1	-11	25	-174
W. Spfld.	1	28	1	14	0	-14	14	-47
AREA IV TOTALS					-5	-111	82	-142
TOTALS	28	555	21	390	-7	-165	319	-821

* Difference in enrollment from the 9th grades at Fort Hunt and Groveton in 1984-85 and West Potomac in 1985-86.

** Difference in enrollment from the 9th grades at Annandale and Jefferson in 1984-85 and Annandale in 1985-86.

A summary of data by area for all programs/courses is presented in Table VIII.

TABLE VIII
SUMMARY DATA
SECTIONS AND ENROLLMENTS BY AREA
NET CHANGES 1984-85 TO 1985-86

Program/Course	AREA I		AREA II		AREA III		AREA IV		TOTAL	
	TJHSST Enroll. = 50		TJHSST Enroll. = 121		TJHSST Enroll. = 66		TJHSST Enroll. = 82		TJHSST Enroll. = 319	
	Net 9th Grade Enroll. = -258		Net 9th Grade Enroll. = -243		Net 9th Grade Enroll. = -178		Net 9th Grade Enroll. = -142		Net 9th Grade Enroll. = -82	
	Sects	Enroll	Sects	Enroll	Sects	Enroll	Sects	Enroll	Sects	Enroll
English (GT)	0	-45	-3	-104	3	-44	-2	-90	-2	-283
Soc. St. (GT)	1	-15	-3	-103	12	209	-5	-130	5	-39
Alg. I (GT)	1	-10	0	0	0	4	0	0	1	-6
Geometry	11	341	1	28	9	55	1	-6	22	418
Geometry (GT)	-1	-52	-1	-58	-4	-25	-2	-56	-8	-191
Earth Sci. (GT)	-2	-41	-1	-26	1	13	-5	-111	-7	-165

RESULTS
Enrollment Analyses

If the initial concern was in fact true, that is, if science and technology enrollments prohibited course offerings in GT or advanced topics, then it would be expected that enrollment reductions in any given course at any school would be greater than the number of science and technology students withdrawn to attend the new school. The concern was that due to the absence of science and technology students other students would not be afforded the opportunity to enroll because of insufficient enrollments to merit teaching the class.

A review of Tables II through VII revealed that this condition (larger reductions in enrollments that the numbers of science and technology students) occurred in GT English classes in ten (10) of 21 cases; in nine (9) of 21 cases for GT Social Studies; in one (1) of the four (4) schools where Algebra I GT was offered; in five (5) of 21 in Geometry; in eight (8) of 21 in Geometry GT; and in four (4) of 20 in Earth Science GT.

A closer view revealed that these schools (10 of 21; 9 of 21; 1 of 4; 5 of 21; 8 of 21; and 4 of 20) represented fifteen of the 21 schools in at least one (1) of the analyses. Table IX displays these data.

TABLE IX
SCHOOLS WITH ENROLLMENT DECLINES IN SELECTED PROGRAMS/COURSES
GREATER THAN SCIENCE AND TECHNOLOGY ENROLLEES

	Eng. GT	S.S. GT	Alg. I GT	Geometry	Geo. GT	E. Sci. GT
Edison					X	
Hayfield					X	X
Lee	X	X	X		X	
Mount Vernon	X	X				
Annandale	X	X			X	
Falls Church	X	X				
Oakton	X			X		
Herndon	X	X				
Langley	X			X		
McLean	X				X	X
Madison		X		X	X	
Chantilly						X
Fairfax		X			X	
Lake Braddock	X	X		X		X
Robinson		X			X	
W. Springfield	X			X		

Further analysis considered the reduction in sections taught at those schools in Table IX that enrolled fewer students. Table X presents these data. The assumption was that if fewer students did not reduce the number of sections then there was no reduction in availability.

Table X lists 12 schools that taught fewer sections of at least one (1) given course/program after demonstrating enrollment declines in those courses/programs greater than the number of students enrolled at science and technology.

TABLE X
SCHOOLS WITH DECLINES IN NUMBER OF SECTIONS TAUGHT OF THOSE
WITH ENROLLMENT DECLINES IN SELECTED PROGRAMS/COURSES
GREATER THAN SCIENCE AND TECHNOLOGY ENROLLEES

	Eng. GT	S.S. GT	Alg. I GT	Geometry	Geo. GT	E. Sci. GT
Hayfield						X
Lee		X				
Mount Vernon	X	X				
Annandale	X	X			X	
Oakton	X					
McLean					X	X
Madison		X				
Chantilly						X
Fairfax		X				
Lake Braddock		X		X		X
Robinson		X			X	
W. Springfield	X			X		

The next step to determine availability is examination of the assumption that if the difference between the number of science and technology students and the enrollment decline was sufficient to teach another section but another section was not organized, then some factor other than science and technology enrollment was operating. Table XI demonstrates these data for each school and program identified in Table X and reduces the possible schools affected by science and technology enrollments to nine and programs/courses to twelve.

TABLE XI
AVAILABILITY OF SUFFICIENT STUDENTS TO CREATE NEW SECTIONS

School	Subject/Course	Number of Students Presumed Not Served*	Sufficient to Offer Another Section**
Mount Vernon	English (GT)	15	No
Annandale	English (GT)	26	Yes
Oakton	English (GT)	1	No
W. Springfield	English (GT)	14	No
Lee	Social Studies (GT)	25	Yes
Mount Vernon	Social Studies (GT)	2	No
Annandale	Social Studies (GT)	28	Yes
Madison	Social Studies (GT)	4	No
Fairfax	Social Studies (GT)	10	No
Lake Braddock	Social Studies (GT)	26	Yes
Robinson	Social Studies (GT)	16	No
Lake Braddock	Geometry	35	Yes
W. Springfield	Geometry	58	Yes
Annandale	Geometry (GT)	8	No
McLean	Geometry (GT)	2	No
Robinson	Geometry (GT)	4	No
Hayfield	Earth Science (GT)	14	No
McLean	Earth Science (GT)	6	No
Chantilly	Earth Science (GT)	22	Yes
Lake Braddock	Earth Science (GT)	33	Yes

*Difference between the enrollment decline and the number of science and technology students.

**A ratio of 22:1 was used in this analysis.

At this point, all other schools have been determined to have experienced no impact because:

1. Their enrollment reduction in any given program or course was equal to or less than the science and technology enrollments at that particular school. (The assumption is that all science and technology students were served at Jefferson.)

2. Their enrollment reduction was greater than science and technology enrollments but their number of sections was not reduced. (The assumption is that if no fewer sections were offered then availability was not reduced.)

3. The number of students not being served was sufficient (22 or more) to organize and teach another section without science and technology students present. (The assumption is that if 22 or more students were present and no section offered then availability was not a factor of science and technology enrollments.)

Continued analysis examined the availability of existing sections for those students presumed not served by the courses/programs. Table XII reports these data. The assumption is that if the numbers were small enough to be absorbed by existing sections within reasonable pupil/teacher ratios then the fact that they were not enrolled was driven by circumstances other than science and technology enrollments.

Table XII indicates a reduction to eight (8) schools and nine (9) programs/courses that may not have been offered because of science and technology enrollments under the assumptions stated.

TABLE XII
AVAILABILITY OF SPACE WITHIN EXISTING SECTIONS
SCHOOL YEAR 1985-86 DATA

		No. Students	Number of 1985-86 Sections/ Enrollments	Sufficient Room
Mount Vernon	English (GT)	15	2/48	No
Oakton	English (GT)	1	3/62	Yes
W. Springfield	English (GT)	14	3/69	No
Mount Vernon	Social Studies (GT)	2	1/18	Yes
Madison	Social Studies (GT)	4	1/27	No
Fairfax	Social Studies (GT)	10	1/21	No
Robinson	Social Studies (GT)	16	4/61	Yes
Annandale	Geometry (GT)	8	1/22	No
McLean	Geometry (GT)	2	1/41	No
Robinson	Geometry (GT)	4	2/50	No
Hayfield	Earth Science (GT)	14	0/0	No
McLean	Earth Science (GT)	6	1/20	No

The final analysis examines the unduplicated student head count within the schools identified in Table XII. The assumption is, for example, that the two (2) students not served in the McLean Geometry (GT) program are, in fact, within the 6 counted as not served in the McLean Earth Science (GT) program. There are then 6 McLean students not served instead of 8. Taking the largest numbers of students at any school within any of the programs/courses examined as the number of actual students not served produces an unduplicated head count of 65 students. Table XIII presents these data.

TABLE XIII
UNDUPLICATED HEAD COUNT

	Eng. GT	S.S. GT	Alg. I GT	Geometry	Geo. GT	E. Sci. GT	Unduplicated Head Count
Hayfield	0	0	0	0	0	14	14
Mt. Vernon	15	0	0	0	0	0	15
Annandale	0	0	0	0	8	0	8
Madison	0	4	0	0	0	0	4
McLean	0	0	0	0	2	6	6
Fairfax	0	10	0	0	0	0	10
Robinson	0	0	0	0	4	0	4
W. Springfield	14	0	0	0	0	0	14
TOTALS	29	14	0	0	14	20	65

CONCLUSION

Under the stated assumptions, 65 students were potentially not served during school year 1985-86 because of enrollments at the School for Science and Technology. This number (65) represents .6% of the 9th grade population not enrolled in the School for Science and Technology.

ANALYSIS OF THE EFFECTS OF STAFFING

Six (6) department chairpersons were hired in the second semester of 1984-85, the year before the School for Science and Technology opened. Table XIV gives the subject area and the prior work location of each of the chairpersons. None of these people were released from their classroom duties to report to the School for Science and Technology until a replacement had been secured. In all cases, a fully certified replacement was secured; however, most of the replacements were younger and less experienced than the veteran teachers selected as department chairpersons.

TABLE XIV
1984-85 STAFFING FOR THE SCHOOL FOR SCIENCE AND TECHNOLOGY
BY SUBJECT AREA AND PRIOR WORK LOCATION

Department Chairpersons	Subject Area	Prior Work Location
English	English	Dept. of Instructional Services
Foreign Language	French	Lake Braddock Secondary
Mathematics	Mathematics	Marshall High School
Science	Biology	Fort Hunt High School
Social Studies	Social Studies	Chantilly High School
Technology	Computer Science	West Springfield High School

Of the 32 classroom teachers hired for 1985-86, the opening year for the School for Science and Technology, 20 or 62% of them were Fairfax County public high school teachers the previous year and six (6) or 19% were Fairfax County intermediate teachers the previous year. The remaining six (6), or 19%, had spent the previous year in business or industry, in research at the National Institute of Health, in teaching at the university level, in teaching in another school system, or working in a central office of the Fairfax County Public Schools. These data are displayed in Table XV.

TABLE XV
1985-86 CLASSROOM TEACHER STAFFING AT THE
SCHOOL FOR SCIENCE AND TECHNOLOGY
BY PREVIOUS YEAR WORK LOCATION

Number/Percent of Teachers	Previous Work Location
20/62%	11 FCPS high schools: West Potomac, Lake Braddock, West Springfield, Mount Vernon, Lee, Jefferson, Fairfax, Falls Church, Annandale, Hayfield, and Oakton
6/19%	6 FCPS intermediate schools: Rocky Run, Lanier, Cooper, Jackson, Hughes, and Whitman
6/19%	Business/industry; university teaching; other school systems; government agencies; and Office of School and Community Relations (FCPS)

TOTAL OF 32

Table XVI contains a school-by-school analysis of the 26 School for Science and Technology teachers who were previously teaching in Fairfax County public schools. These teachers came from 11 of the 22 high schools and 6 of the 19 intermediate schools. Thus, 17 of the 41 high and intermediate schools, or 41% were directly affected by staffing at the School for Science and Technology. A total of 24 Fairfax County public high or intermediate schools, or 59%, were unaffected by staffing at the School for Science and Technology.

TABLE XVI
NUMBER OF 1985-86 SCHOOL FOR SCIENCE AND TECHNOLOGY
CLASSROOM TEACHERS BY PREVIOUS FCPS SCHOOL ASSIGNMENT
AND FIELD OF CERTIFICATION

School	Number of Teachers and Certification	Total
Annandale	1 Biology; 1 Physics	2
Chantilly		0
Edison		0
Fairfax	2 Math	2
Falls Church	1 Physical Education	1
Hayfield	1 Math	1
Herndon		0
Jefferson	1 Physical Education; 1 Physics; 1 Business Ed; 1 Biology	4
Lake Braddock	1 Math; 1 English; 1 Foreign Language	3
Langley		0
Lee	1 Foreign Language	1
Madison		0
Marshall		0
McLean		0
Mount Vernon	1 Biology	1
Oakton	2 Math	2
Robinson		0
South Lakes		0
Stuart		0
West Potomac	1 English	1
West Springfield	1 English; 1 Biology	2
Woodson		0
TOTAL HIGH SCHOOL		**20**
Cooper	1 Math	1
Franklin		0
Frost		0
Glasgow		0
Herndon		0
Holmes		0
Hughes	1 Foreign Language	1
Irving		0
Jackson	1 English	1
Key		0
Kilmer		0
Lanier	1 Industrial Arts	1
Longfellow		0
Poe		0
Rocky Run	1 Industrial Arts	1
Sandburg		0
Thoreau		0
Twain		0
Whitman	1 Physical Education	1
TOTAL INTERMEDIATE SCHOOL		**6**
GRAND TOTAL		**26**

Table XVII displays certification information about the 26 FCPS teachers who transferred to the School for Science and Technology for the 1985-86 year. The largest group of teachers by certification transferring to the School for Science and Technology is the group of seven (7) mathematics teachers. The Department of Personnel Services reported that it was able to meet this demand for mathematics teachers with early-contracted mathematics teachers who were well trained.

According to the Department of Personnel Services, the pool of applicants for teaching positions in the sciences is not a strong one. At the School for Science and Technology two of the four biology teachers and all of the physics teachers were from Annandale and Jefferson High Schools. Because these two schools with declining enrollments were being merged, destaffing and transferring of teachers to science and technology is considered to be a positive action.

For all other certification areas, the Department of Personnel Services reported that it has been able to recruit and employ qualified applicants. However, because of the experience levels of most School for Science and Technology faculty, it is reasonable to assert that their replacements were probably less experienced.

The impact of losing a particular teacher from any given school is often minimized by dividing that teacher's responsibilities among several teachers already on staff. For example, if a high school teacher selected for the School for Science and Technology taught one class of AP Calculus, two sections of Algebra II-Trigonometry (GTP), and one other mathematics class, the replacement teacher would most likely not be given that exact assignment. Instead, the advanced and GT classes would likely be assigned to an experienced teacher already on staff, and the replacement teacher would be given a more standard schedule of assigned classes. Thus, the impact of teachers transferring to the School for Science and Technology would be considerably lessened. Data which follow tend to support this position.

TABLE XVII
NUMBER OF 1985-86 SCHOOL FOR SCIENCE AND TECHNOLOGY TEACHERS
PREVIOUSLY EMPLOYED BY FCPS BY AREA OF CERTIFICATION

DISCIPLINE	NUMBER
Biology	4
Business Education	1
English	4
Foreign Language	3
Industrial Arts	2
Mathematics	7
Physical Education	3
Physics	2
TOTAL	26

Referring back to Tables XVI (page 19) and XIII (page 17) we find that there is only one (1) school (West Springfield) of the eight (8) where students were potentially not served in a given program/course where a teacher in that same program/course was transferred to science and technology. The West Springfield program involved is GT English. Table XVIII presents the information demonstrating this comparison.

TABLE XVIII
COMPARISON OF SCHOOLS WITH POTENTIAL ENROLLMENT
IMPACT WITH SCHOOLS WITH FACULTY TRANSFERS

Schools with Potential Enrollment Impact (Table XIII)	Courses/Programs Affected (Table XIII)	Number and Discipline of Faculty Transferred to S&T (Table XVI)
Hayfield	Earth Science (GT)	1 Mathematics
Mount Vernon	English (GT)/Social Studies (GT)	1 Biology
Annandale	Geometry (GT)	1 Biology/1 Physics
Madison	Social Studies (GT)	None
McLean	Geometry (GT)/Earth Science (GT)	None
Fairfax	Social Studies (GT)	2 Mathematics
Robinson	Geometry (GT)	None
West Springfield	English (GT)	1 English/1 Biology

Further analysis examined each school (excluding Jefferson) with faculty (excluding physical education and foreign language) who had transferred to science and technology for impact on offerings at higher grade levels since the preceding comparison concentrated upon ninth grade enrollments only. Table XIX presents these findings.

TABLE XIX
EFFECT OF FACULTY TRANSFERS ON SELECTED
COURSE OFFERINGS GRADES 10-12

School	Faculty (Number & Discipline)	Changes in Offerings School Year 1984-85 to 1985-86
Annandale	1 Biology/1 Physics	AP Physics was not available during either school year. AP Biology sections remained at one (1) each year and enrollment increased from 20 to 22 over the period.
Fairfax	2 Mathematics	AP Calculus AB remained at one (1) section for both years and BC increased from one (1) to two (2) sections. AB demonstrated an enrollment increase of five (5) and BC of nine (9).
Hayfield	1 Mathematics	Both AP Calculus AB and BC remained at one (1) section each for both years. AB demonstrated an enrollment increase of seven (7) and BC of one (1).
Lake Braddock	1 Mathematics/1 English	English 10 (GT) and AP English 12 both experienced increases in numbers of sections offered (two each). English 11 (GT) remained constant at one (1) section. AB Calculus increased by one (1) section (from 3 to 4) and nine (9) students, and BC Calculus remained constant with two (2) sections and an enrollment increase of four (4).
Mount Vernon	1 Biology	AP Biology sections held constant at one (1) each year. Enrollment declined by five (5) (from 24 to 19).
Oakton	2 Mathematics	BC Calculus held at two (2) sections each year declining two (2) students. AB Calculus declined one (1) section (from 3 to 2) and enrollments declined 11 (from 67 to 56).
W. Springfield	1 English/1 Biology	English 10 (GT) declined from six (6) to four (4) sections (158 to 105 students), English 11 (GT) increased from three (3) to five (5) sections (78 to 139 students), and AP English held at four (4) sections each year (16 fewer students). AP Biology held at one (1) section each year with an enrollment increase of nine (9).

CONCLUSION

Reductions in faculty at other high schools due to transfers to the School for Science and Technology correlated with schools potentially serving fewer students because of enrollments at science and technology in only one (1) instance; i.e., English GT offerings at West Springfield High School. Faculty transfer impact on advanced/accelerated course offerings at other grade levels likewise was a potential at only one (1) high school; specifically, Oakton High School offered one (1) fewer section of AB Calculus and experienced a transfer of two (2) mathematics teachers to science and technology.